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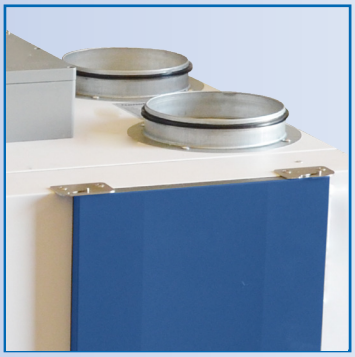

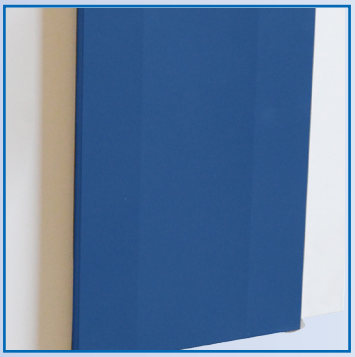

User's manual | Recovery ventilators

Recovery ventilators

HRU-MinistAir-W-450

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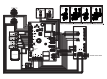
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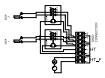
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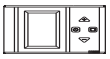
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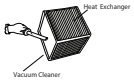

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Safety informations

PROHIBITED

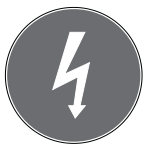
- This unit has to be used under proper conditions according to its technical specification and design purpose. (Otherwise responsibility belongs to practitioner.)
- Unauthorized personnel must not interfere in unit and/or must not use unoriginal srpea parts. (Otherwise responsibility of failure that may occur belongs to practitioner.)
- Do not install this product in a refrigerated warehouse, heated swimming pool or other altoicon where temperature and humidity are significantly different. (Failure to heed this warning may result in electrical shock or malfunctioning.)
- Do not install this product where it will be directly exposed to rain. (Failure to heed this warning may result in electrical shock or malfunctioning.)
- Do not install this product in a location where acid, alkali or organic solvent vapors, paints or other toxic gases, gases containing corrosive components or high concentrations of oily smoke are present. (Failure to heed this warning may result not only in malfunctioning but also fire, power leakage and electrical shock.)
- Do not use this product outside the range of its rated voltage and control capacity.

ATTENTION

- Install this product in an environment where the temperatunrgee sr afrom 0 °C to +40 °C and the relative humidity is less than 80%. If condensation is expected to form,heat up the fresh outside air by a duct heater etc.
- Select an adequately sturdy position for installing the product and install it properly and securely.
- Use the designated electrical wires for the terminal board connections and connect the wires securely so that they will not be disconnected. (Failure to ensure proper coinonnesc tmay result in fire.)
- When passing metal ducts through wooden buildings clad with metal laths, wire laths or metal, these ducts must be installed in such a way that they will not make electrical contact with metal laths, wire laths or metal sheets. (Power leakage can cause ignition.)
- The outside ducts must be tilted at a gradient (1/30 or more) downwards toward the outdoor area from the main unit, and properly insulated. (The entry of rain water may cause power leaks, fire or damage to household property.)
- Gloves should be worn while installation. (Failure to heed this warning may result in injury.)
- A dedicated circuit breaker must be installed at the origin of mains power supply. This circuit breaker must be provided with a means for locking (lock and key).
- The body of the unit, room control panel and cables keep away unit 3 m. distance

- This product must not be disassembled under any circumstance. Only authorized repair technicans are qualified to conduct disassembly and repairs. (Failure to heed this warning may result in fire, electrical shock or injury.)

- Connect the product properly to the ground.(Malfunctioning or power leaks acn cause electrical shock.)



- An isolator switch having minimum contact gap of 3 mm in all poles must be provided as means of disconnecting the power supply.

NOTE: The installations,which is not available for installation and operation manual, is out of guarantee.

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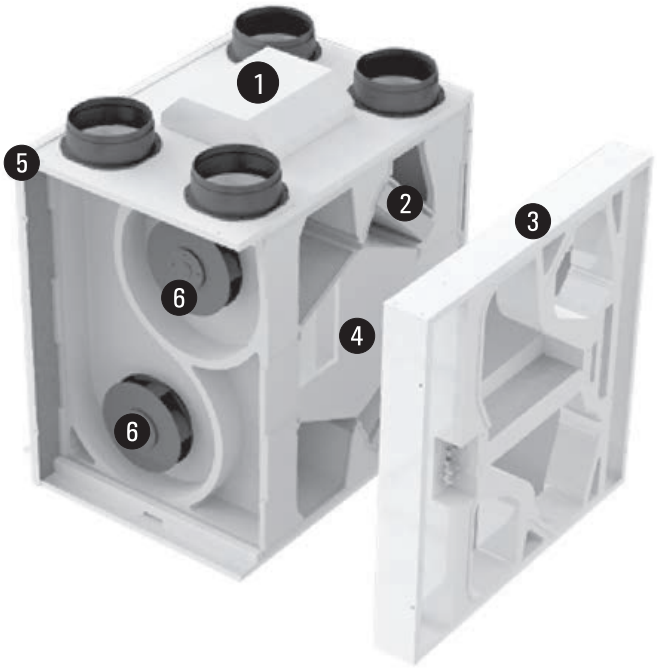
Components

HRU-MinistAir-W-450 units are designed for recovering part of the energy of the exhausted air in a ventilation system. The recovered energy is directly transferred to the supplied fresh air, that reduce the necessary load on the air conditioning system.



1. Control
2. Exhaust and Supply Air Filtres
3. By-Pass
4. Heat Recovery Exchanger
5. Casing
6. Exhaust and Supply Air Fans

Technical data

	HRU-MinistAir-W-450
Air Flow (m3/h)*	470
Nominal Voltage (V/Hz/Ph)	230 / 50 / 1 ~
Max. Power Input (W)	180
Current Draw (A)	1,54
Max. Sound Pressure (dB (A))**	48
Unit Weight (kg)	41
Filter	G4 Class Synthetic Filter According to EN 779 (F class filter is optional)

* External static pressure is 0Pa.
** Measured at 1,5m distance to the unit.

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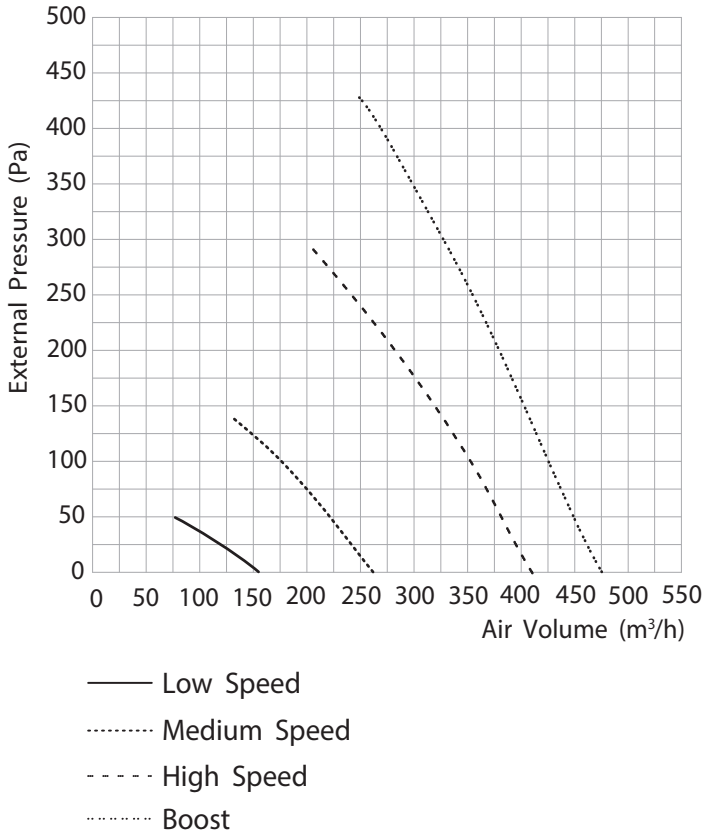
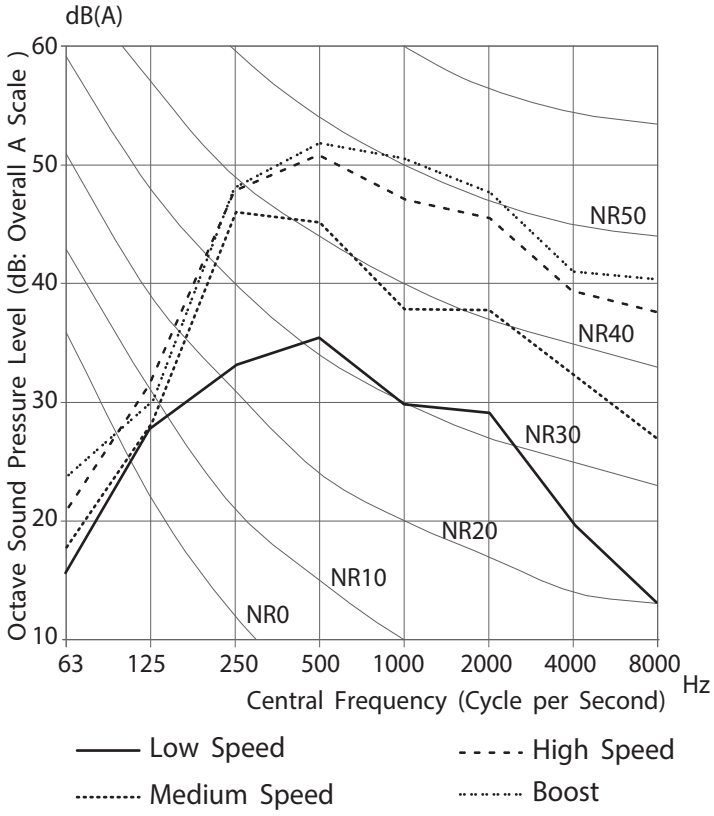
Performance curve



Sound curve



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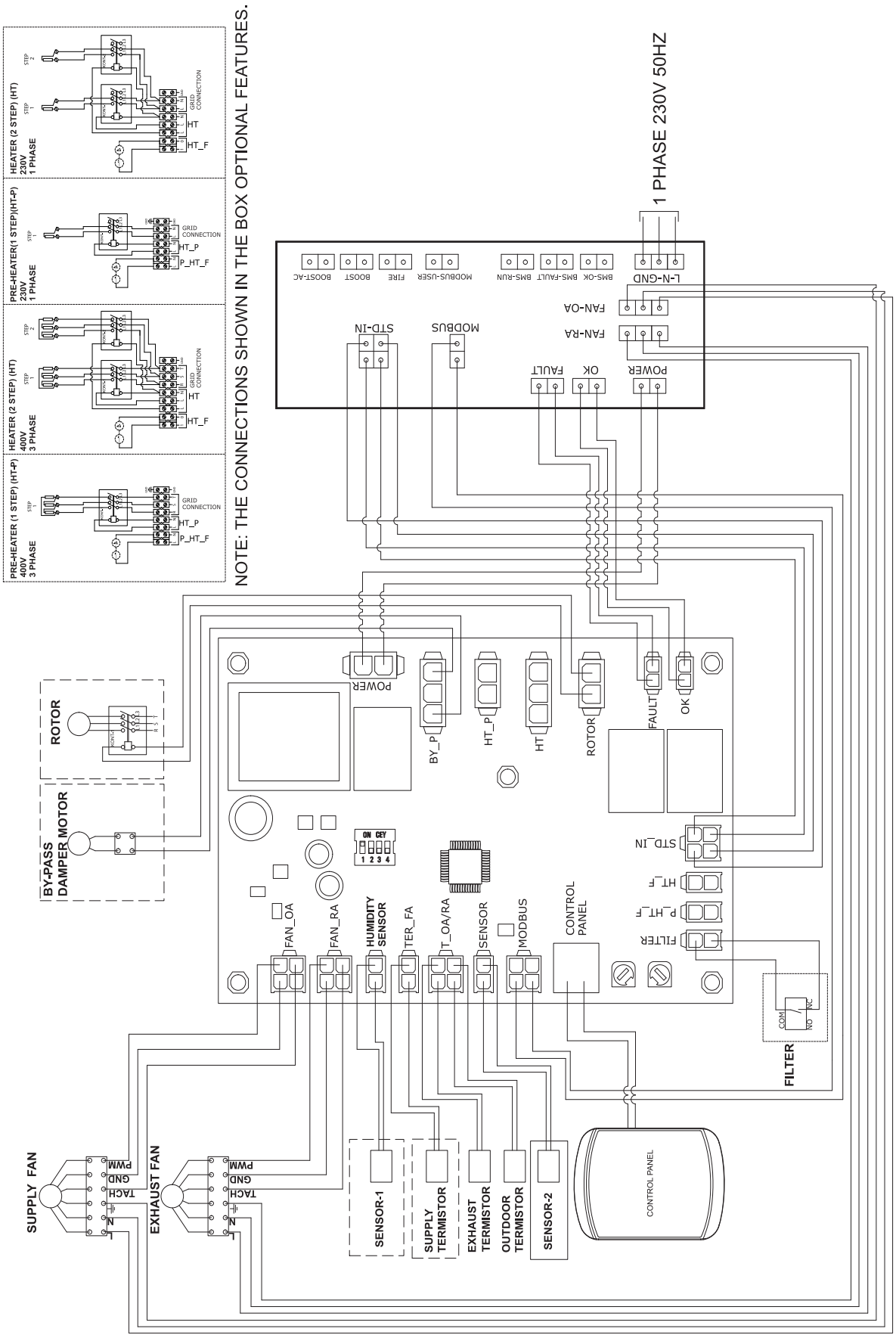
Wiring diagram



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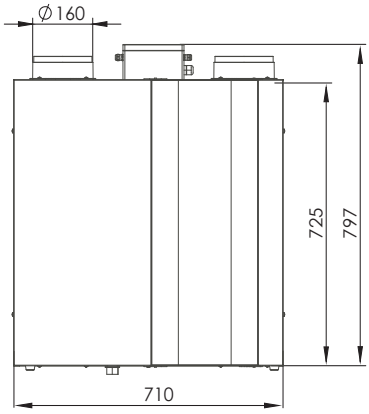
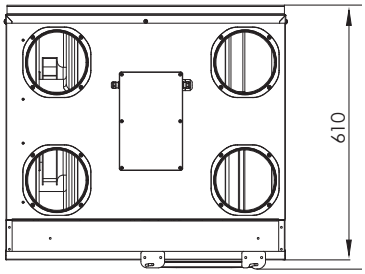
Unit dimensions



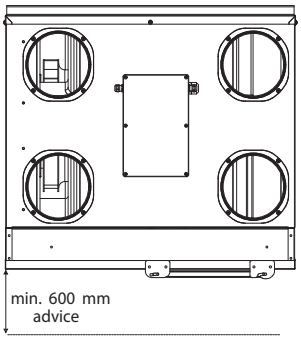
View from front



View from top

* All measurement values are mm.

Service space

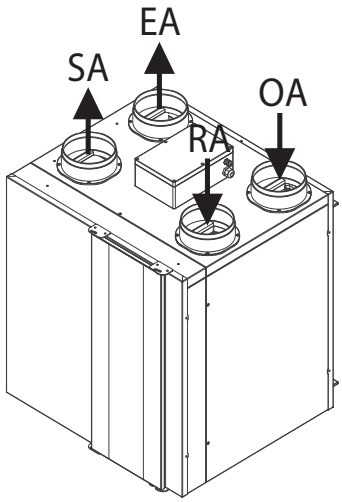


View from top

* A clear space of 600 mm must be provided in front of the unit for service.

Installation

Installation Version



EA - Exhaust Air
SA - Supply Air
OA - Outdoor Air
RA - Return Air

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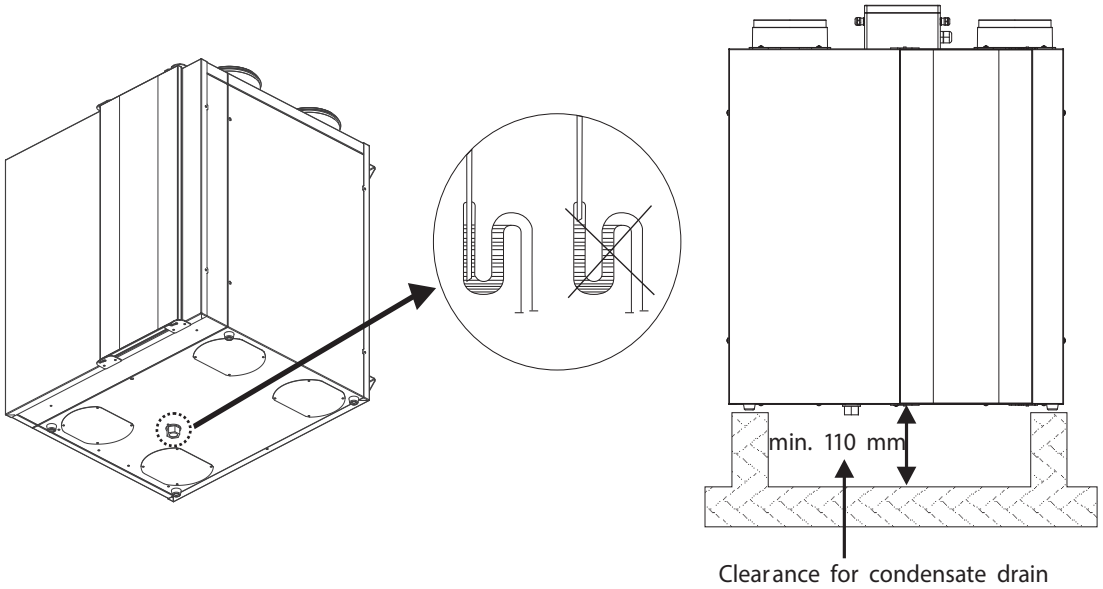
Installation

Discharge Condensate Installation

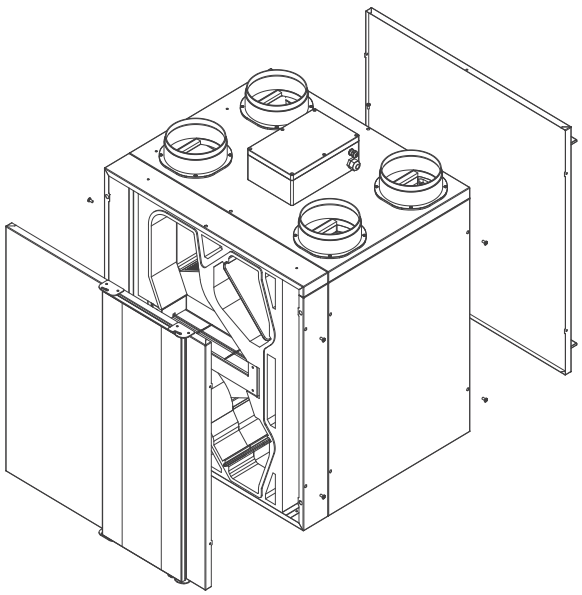
Moisture condensed water should be drained out of the unit, to prevent water damage in heat recovery unit and ductwork system. Following precautions should be observed:

1. Condensate pipe connections to main drainage line should be less than the diameter of the drainage outlet connection (Not less than a diameter of 20 mm).
2. A union or pipe coupling should be fitted at the pipe connections to permit easy disconnection to clean any dirt sediments.
3. The connection drain pipe shall have a diameter of at least 20mm and a sufficient slope; under no circumstance may the drain pipe be connected directly.



Installation / Remove of Cover Plate

1. Remove front and rear cover plates by unscrewing fittings.
2. Front cover plate has 4 pcs. M5x10 screws.
3. Rear cover plate has 6 pcs. M5x10 screws.



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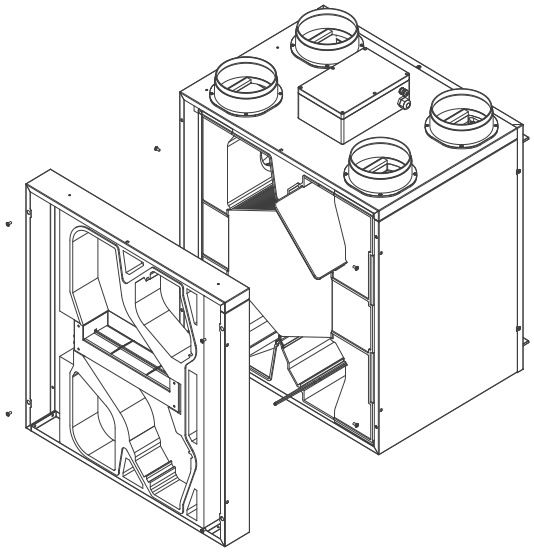
Installation

Installation / Remove the By-Pass Damper

1. Remove front cover plate by unscrewing fittings.
2. Remove / install by-pass damper module by unscrewing 4 pcs. M5x10 screws.
3. Insert front cover plate by screwing fittings.

Note: By-pass is installed as a standard,

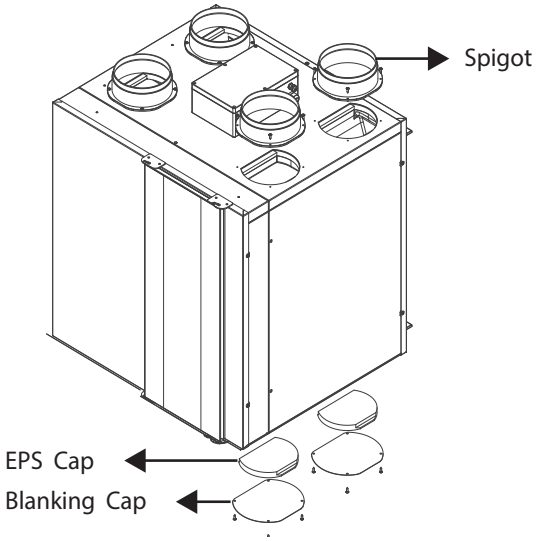


Connection of Power Supply

1. Power supply (230V / 50Hz / 1 Phs), power connection (L, N, Ground)
2. Control cable (5m). Length of control cable is 5m. Please cabling this control cable to the place where control panel will be connected.

Installation of Spigots at Exhaust Side

1. To remove the spigots unscrew 4 pcs. 4.2x13 screws.
2. Remove the blanking caps by unscrewing the screws (4 pcs. M5x10)
3. After removing blanking caps, please also remove EPS caps and install them upperside of the unit.
4. Install the spigots in to the exit hole underside and secure with retaining screws.
5. Install the blanking caps into the exit hole uppersidee caunrde swith the retaining screws.



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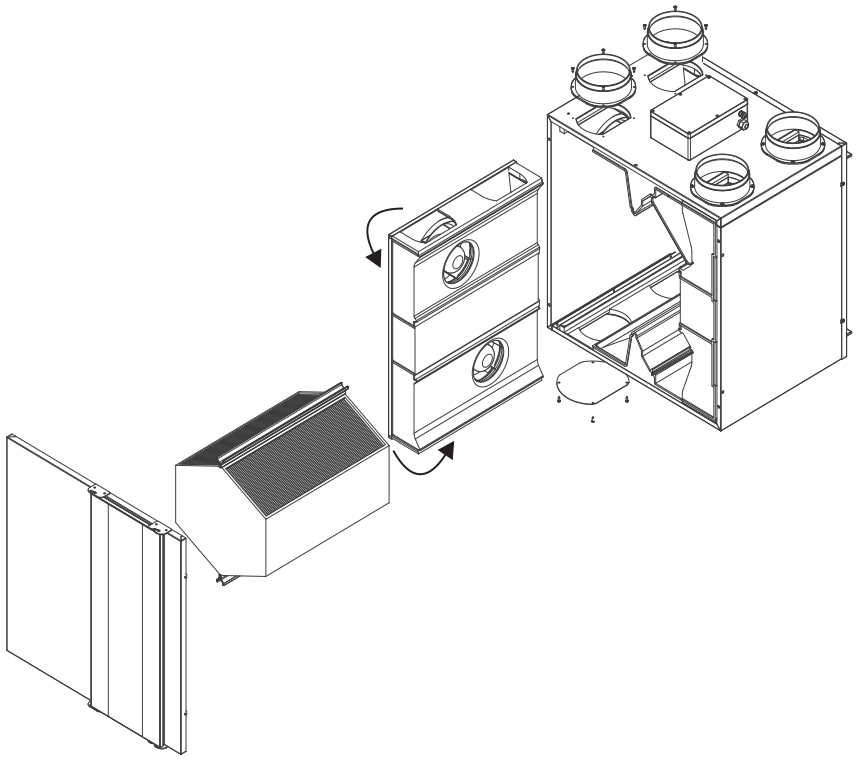
Installation

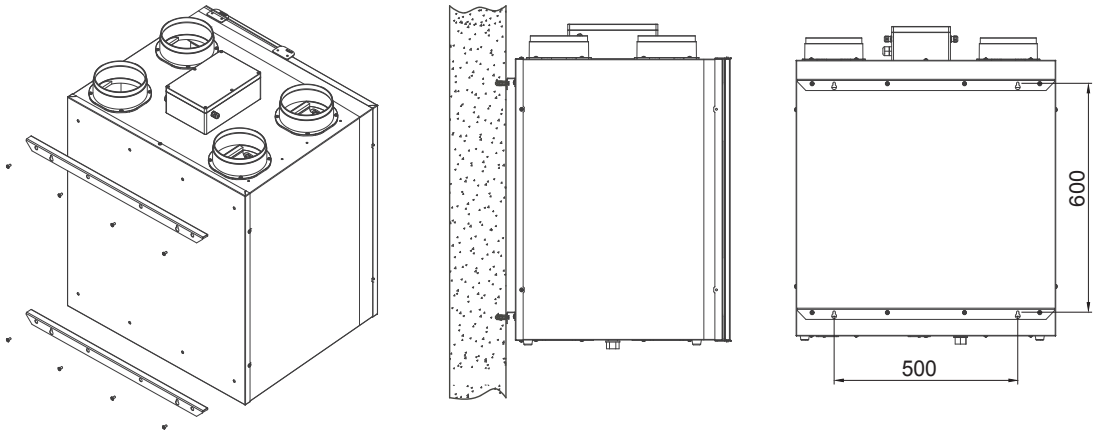
Installation of Spigots at Supply Side

1. To remove the spigots unscrew 4 pcs. 4.2x13 screws.
2. Remove the blanking caps by unscrewing the screws (4 pcs M5x10).
3. Remove front cover plate.
4. Remove heat exchanger.
5. Remove electrical connection of fans.
6. Remove EPS fan module, reverse it and re-install. (Rotate it 180° in the direction of the arrow).
7. Attach electrical connection of fans. (OA as RA, RA as OA)
8. Re-install heat exchanger.
9. Re-install front cover plate.
10. Install the spigots in to the exit hole underside and sweciuthre the retaining screws.
11. Install the blanking caps into the exit hole upperside and secure with the retaining screws.



Installation of Spigots at Supply Side

1. Screw 2 wall brackets to the rear cover with appropriate fittings (4 pcs M5x10).
2. Fit 2 brackets to the wall (dimensions between mounting holes are indicated on the picture below).
3. Be sure that condensation drain is connected properly.



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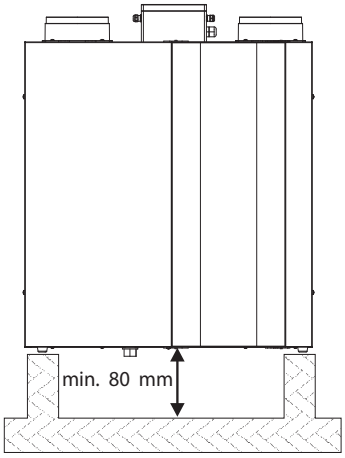
Installation

Floor Mounting

Wall brackets also can be used for floor mounting to lift the unit up.
1. Remove unit's base feet. (4 pcs).
2. Screw 2 wall brackets to the underside of the unit.
3. Install base feet on to the wall brackets.

Note: Minimum distance between underside the unit and floor should be 80mm to assemble discharge pipe easily.



Select of electrical cable cross-section

Electrical Cable Selection of Heat Recovery Unit - 230V 1phase

Unit Model	Unit Power (W)	Fuse (A)	Cable Cross - Section (mm²)					
			1,5	2,5	4	6	10	16
HRU-MinistAir-W-450	170	2	138	230	-	-	-	-

Note: The values given in the table is the length of the cable in meters (m). Cable property: 3 x (phase + neutral + earth).

Electrical Cable Selection of Electrical Heater- 230V 1phase

Unit Model	Unit Power (W)	Fuse (A)	Cable Cross - Section (mm²)					
			1,5	2,5	4	6	10	16
HRU-MinistAir-W-450	160	1	6	61	102	163	-	-
		1,5	10	-	68	109	163	-
		2	16	-	51	82	122	203

Note: The values given in the table is the length of the cable in meters (m). Cable property: 3 x (phase + neutral + earth).

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Control

Operation	Description	Availability
Fan Speed Control	3 steps fan speed control of supply and exhaust fan is available.	3 steps (each fan) (High/Med/Low)
Boost Function	It is used for increasing fan speed: Alternative-1: Via boost button on the control board Alternative-2: Via dry contact or light power input (230V) (like kitchen light, bathroom light etc.) on PCB board.	Standard Standard
Filter Function	There are 2 alternatives to control filters: Alternative-1: It records run time of the unit and when set time expires, control board gives an alert for filter change. Alternative-2: Filter change time can be controlled with pressure switch mechanically. With this method, when filter needs to be changed control board gives an alert.	Standard Optional
By-Pass Function	Filtered fresh air is supplied indoor without passing in heat exchanger.	Standard
Electrical Heater Control Function	Electrical heater is controlled up to 2 steps automatically according to the set temperature and indoor temperature.	Optional, depends on Return Air or Room or Supply Air
Sensor (VOD)	Fans are running continuously in accordance with CO_2 or air quality sensors.	Optional
Sensor (Humidity)	Fans are running continuously in accordance with indoor air humidity.	Optional
Frost Protection Function	Where outdoor air is too low, this function is a protection method to prevent heat exchanger from freezing.	Standard
Pre-Heater Function	Where outdoor air is too low, fresh air is heated by a pre-heater before it enters into the unit. This function is a protection method to prevent heat exchanger from freezing.	Standard
External Control (BMS) Function	IN: Unit can be on/off via control board. OUT 1: Information of "unit status". OUT 2: Information of "fault".	Standard
Modbus Function	It controls all functions of unit via PC or central automation board.	Standard
Weekly Timer Function	Unit can be programmed to operate on certain periods of the week.	Standard
Log Function	All possible working options of the unit can be recorded.	Standard
Fire Function	It is used for changing working status of the unit in case of fire.	Standard
Warnings	- Filter change - Fan Fault - Pre-Heater Fault - Heater Fault	Standard (Display error code)
Child-Proof Protection Function	It is used to lock the keypad.	Standard

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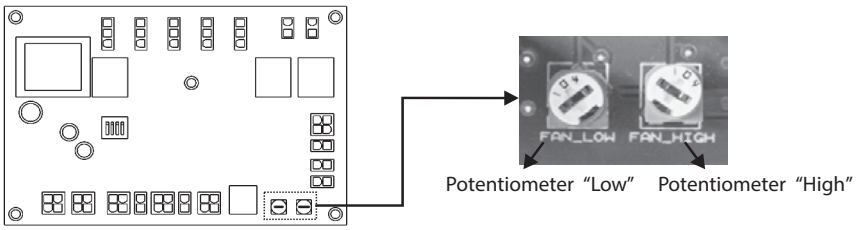
Control

Fan Speed Control Function

Control board has 4 different fan speeds: ,,Low", ,,Medium", ,,High", ,,Boost". These fan speeds are set to specific values by default. The maximum fan speed is ,,Boost". If it is desired to change fan speeds, ,,Low" and ,,High" set values can be changed by potentiometers on control board. Control board automatically set the value of "medium" by averaging ,,High" and ,,Low" values.



Note: If ,,Low" is set to the highest and ,,High" is set to the lowest value, unit continues to run according to default settings. Factory setting values can be change.

Filter function

This function controls filter change time. There are 2 alternatives to control filters:

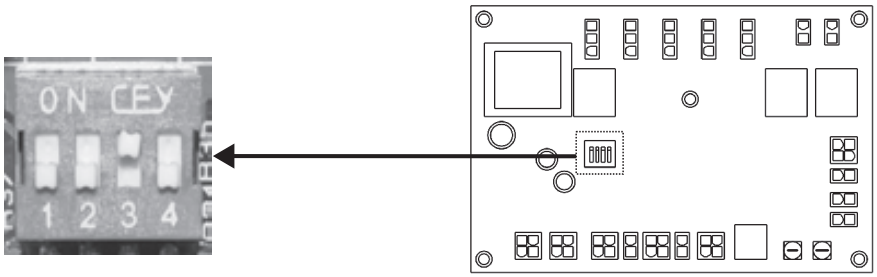
1. It records run time of the unit. Filter change time is set a particular run time by factory settings. When set time expires, control board gives an a lert (red warning light flashes) for filter change. After filter cleaning is done, filter setting time can be reset by pressing simultaneously and for 3 seconds.

Note: Default run time set value is changeable.

2. Filter change time can be controlled by pressure switch mechanically. With this method, when filter needs to be changed, control board gives an alert (red warning light flashes). After changing/cleaning is completed, warning light goes off automatically.

By-pass Function

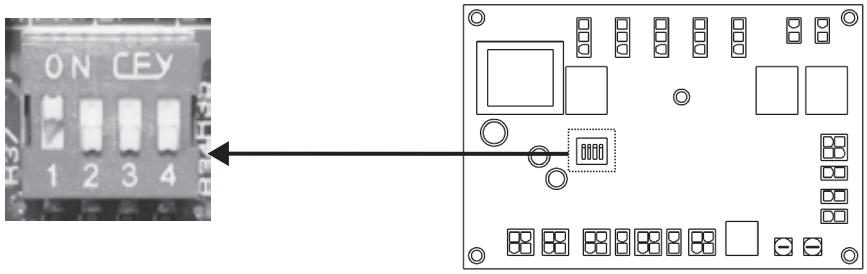
By-pass function is used when filtered fresh air is desired to be supplied to indoor without passing through heat exchanger (transition seasons). Control board decides whether by-pass module will be opened or not by controlling outdoor air temperature, return air temperature and set temperature values.



Note: To activate this function, turn „deep switch 3" on

Electrical Heater Control Function

Electrical heater control function controls electrical heater that is used to increase temperature of supply air. It runs due to the return air temperature and set temperature values. 1 or 2 steps electrical heater can be controlled.



Note: To activate this function, turn "deep switch 1" on.

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Control

Frost Protection Function

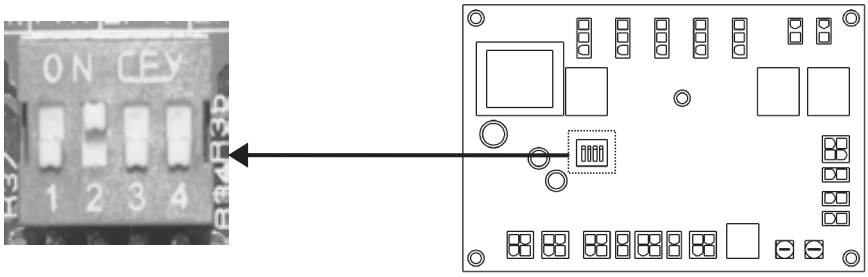
Condensation occurs inside the unit where outdoor air temperature is below 0°C. Heat changer can be damaged if condensation water freezes inside. Control board changes fan speed periodically to protect freezing.

Note: This function is active when outdoor air temperature is below -3°C. Set temperature value is changeable.

Pre-Heater Function

This function helps to protect unit from freezeing where outdoor air temperature is too low. It runs due to outdoor air temperature. 1 step electrical heater can be controlled.

Note: To activate this function, turn "deep switch 2" on.



Note: This function is active when outdoor air temperature is below 0°C. Set temperature value is changeable.

Boost function

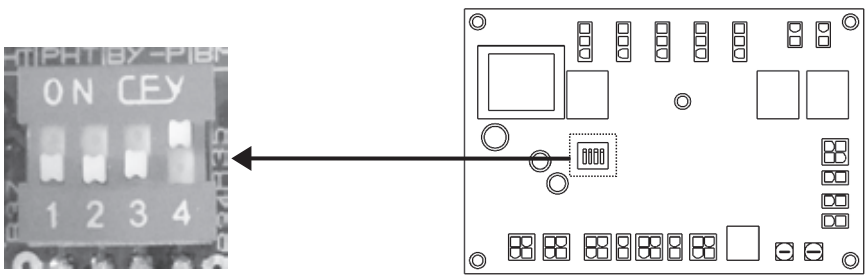
This function is used when large amount of exhaust and fresh air is needed (at the time of using kitchen/bathroom/wc, etc.) while ventilation is still going on. There are 2 boost functions on controller. One of them is on control panel, the other one is on control board:
1. ,,Boost" function is activated by pressing for 3 seconds. After unit runs at boost speed (maximum speed) and during boost time (15 minutes) it begins to run at the speed value that is set before boost function is activated.
2. There is one dry contact relay input and one 230V input on control board. If one of these inputs is activated, unit begins to run at ,,Boost" speed. When activated input is passive again, unit begins to run at the speed value that is set before boost function is activated.

Note1: Boost speed and boost time are changeable

Note2: During operating at boost function on Basic Panel, ,,High" (H), ,,Medium" (M) and ,,Low" (L) speed leds are on at the same time.

BMS Function

BMS Function makes the unit to be monitored on a central automation syst
1. Dry contact outputs: There are 2 dry contact outputs. Working status and failure status of the unit can be monitored.
2. Dry contact input: Operation of the unit (on/off) can be done by dry contact input. When this function is active, you can't turn on/off the unit on control panel. To activate this function, turn "deep switch 4" on.



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Control

Modbus Function

Modbus function helps to monitor the unit and change all possible functions on a central automation system.

Weekly Timer Function

Weekly timer function is available. It can be programmed to operate automatically on certain periods of the week.
Three options are available:
1. 5+0: Active for 5 weekdays, off on weekends
2. 5+1: Active for 5 weekdays and saturday, off on sunday
3. 5+2: Active for all days of the week

Fire Function
There is a dry contact relay on the control board. The fire function is activated in case of on fire, if the dry contact relay is attached to fire system.

Note: In case of fire, the unit is closed on Basic Panel. Different scenarios can be selected on Pro Panel.

Warnings

There are three types of warnings on panel:
1. If red warning signal lights continuously, it means fan failure or outdoor air thermistor failure. (Unit is not working.)
2. If red warning signal and fan speed led lights simultaneously, it means failure of components. (Only fans are running.)
3. If red warning signal flashes, it is an alarm of dirty filte
Screen failure code is "ERR" on Pro Panel. (See failure code list.)

Note: After troubleshooting, press for 3 seconds.

Child Proof Protection Function
It is used to lock the keypad. (See use of keypad.)

Note: Child proof protection is available on Pro Panel. This function will be activated if any button isn't pressed for 10 seconds.

Sensor VOD

Sensor VOD function is available on ProP anel. It runs with CO_2 sensor or air quality sensor. Speed of fans changes automatically according to the information coming from these sensors.

Sensor Humidity
Sensor Humidity function is available. It runs in accordance with the humidity of the indoor air. Speed of fans changes automatically according to the information coming from these sensors.

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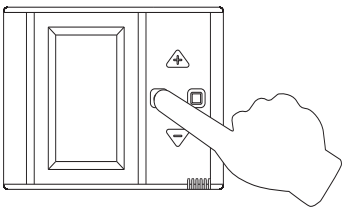
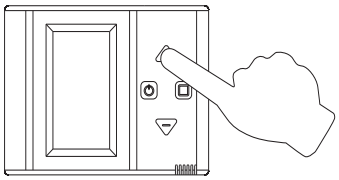
Control

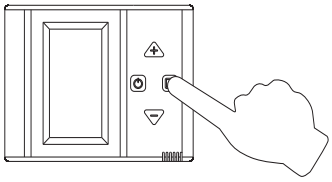
Control Function



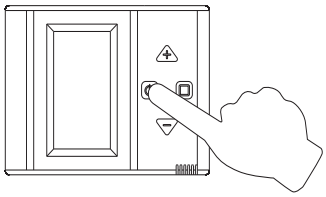
1. ON / OFF: Press ⏻ for 3 seconds.



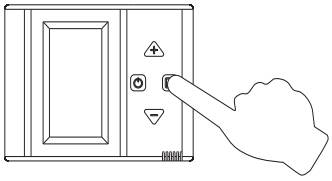
2. Press ▲ or ▼ to switch to screens in between.
   - Press ▲ to switch to next screen
   - Press ▼ to switch to previous screen



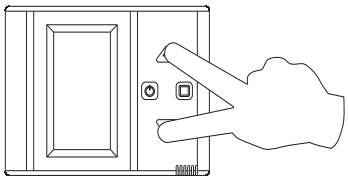
3. Press ▣ to change any value on screen.
   - Press ▲ to increase existing valu +1
   - Press ▼ to decrease existing value -1



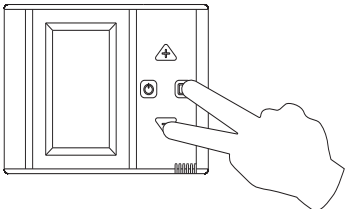
4. Press ⏻ to exit existing menu.



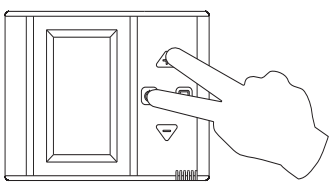
5. Press ▣ to achive „boost" function



6. Child Lock: To activate this function, press ▲ and ▼ for 3 seconds. When child proof protection is active, keypad is locked and buttons do not work. To deactivate this function press ▲ and ▼ for 3 seconds.



7. To reset the duration of filter contamination depending time, press ▣ and ▼.



8. Press ⏻ and ▲ simultaneously to adjust screen brightness and contrast.

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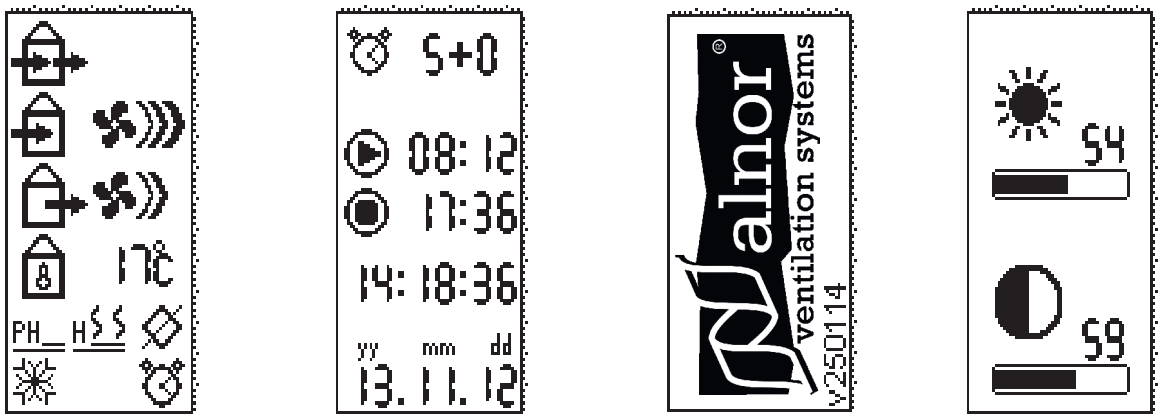
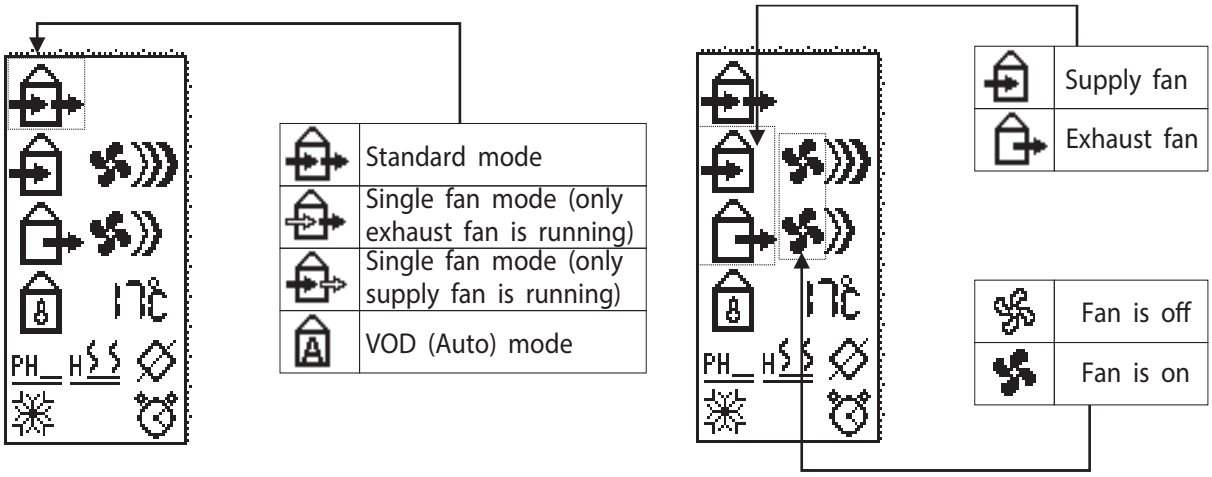
Control

Panel Screen

1. Screen	2. Screen	3. Screen	4. Screen
Main Screen	Timer	Company Introduction	Screen Brightness and Contrast Setting



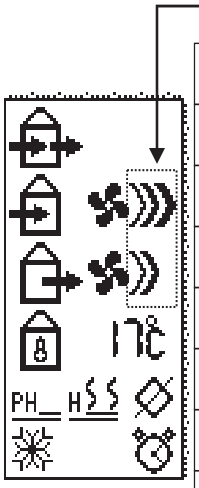
1. Sreen Symbols (Main Screen)



	Standard mode
	Single fan mode (only exhaust fan is running)
	Single fan mode (only supply fan is running)
	VOD (Auto) mode

	Supply fan
	Exhaust fan

	Fan is off
	Fan is on



	Fan speed: High
	Fan speed: Med
	Fan speed: Low
B	Fan speed: Boost
A	Fan speed: Auto (If unit is on VOD mode.)
	Fan speed: High (If unit is working at constant flow rate/constant pressure function.)
	Fan speed: Med (If unit is working at constant flow rate/constant pressure function.)
	Fan speed: Low (If unit is working at constant flow rate/constant pressure function.)

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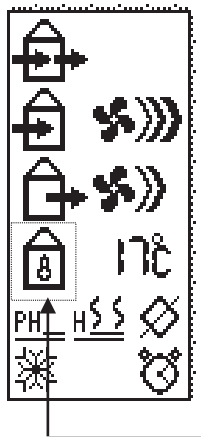
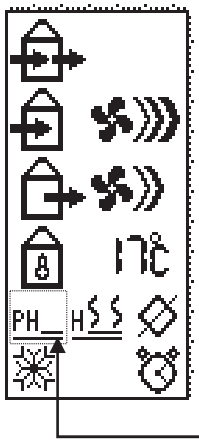
Control

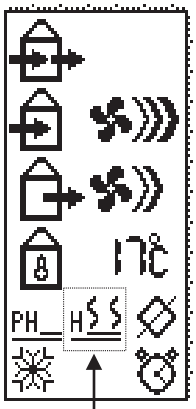
1. Screen Symbols (Main Screen)



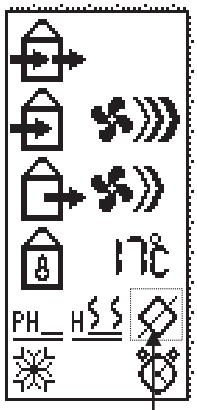
	Outdoor air temperature
	Indoor air temperature
S	Set temperature



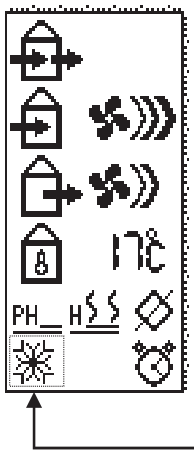
	There is no pre-heater.
PH__	Pre-heater is off.
PH$$	Pre-heater is on.



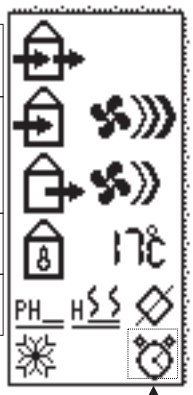
	There is no heater.
H__	Heater is off.
H$$	Heater is on at first stage.
H$$$	Heater is on at first and second stage.
CH__	There is water coil. It is off.
CH*	Cooling coil is on.
CH$$	Heating coil is on.



	There is no by-pass.
◆	By-pass is off.
◇	By-pass is on.



	No failure, freezing scenario is off.
ERR	During a failure situation, the code "ERR" and its code will be seen on screen.
FILTER	Filter dirty
*	Freezing scenario is on.



	BMS and TIMER is not adjusted.
BMS	BMS is on.
⏱	TIMER is on.

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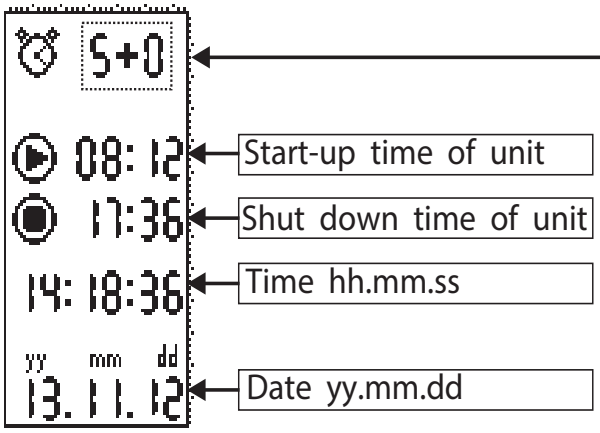
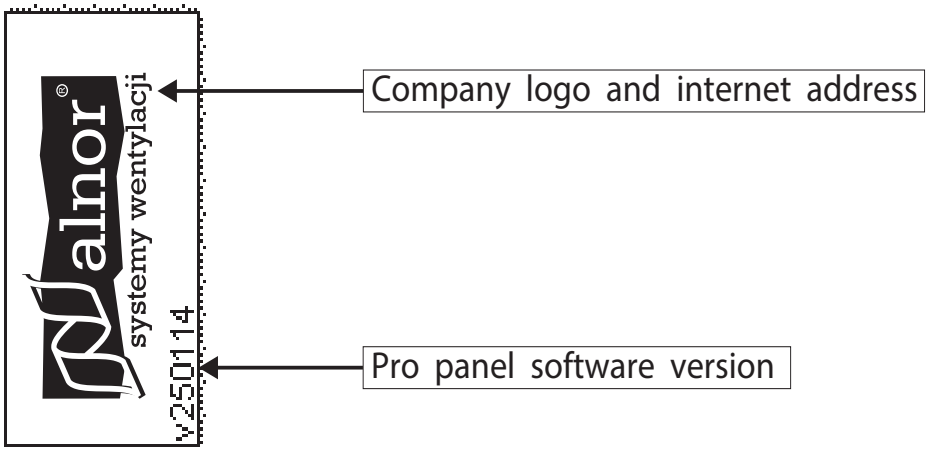
Control

2. Screen Symbols (Timer)

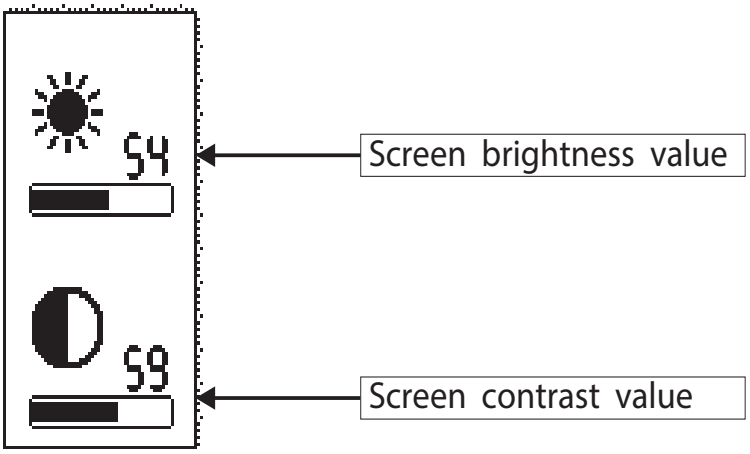


---	TIMER is off
5+0	TIMER is on: 5 weekdays
5+1	TIMER is on: Weekdays+Saturdays
5+2	TIMER is on: All days

3. Screen Symbols (Company Introduction)



4. Screen Symbols (Screen Brightness and Contrast Setting)



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Control

Error Code List

Register 25 Value	Panel Screen Code	Description
0	-	Unit is working normally
1	ERR 1	Fire alarm
2	ERR 2	Heater alarm
3	ERR 3	Supply fan failure (OA
4	ERR 4	Exhaust fan failure (RA)
5	ERR 5	Outdoor iar temperature sensor failure (OA)
6	ERR 6	Return air temperature sensor failure (RA)
7	ERR 7	Panel sensor failure (P)
8	ERR 8	Supply air temperature sensor failure (SA)
9	ERR 9	Sensor-1 failure
10	ERR 10	Sensor-2 failure
11	ERR 11*	Gas pressure fault
12	ERR 12	Alarm of dirty filter
13	ERR 13*	Gas presssure fault (gas circuit get blocked)
14	ERR 14*	Reset option is active

Note: * This is only available for DX units.

Modbus Connect

1. Introduction

This document includes the protocol of Modbus communication that is used with ENECON and ENECON-DX control board.

2. Properties

Control board uses Modbus RTU protocol via RS485 connection. The unit works as Slave and the information can be taken from an external Master module.

Connection information of the unit is listed as below:
Connection Type: **Modbus RTU Slave**
Standard Address: **1**
Link speed: **9600**
Party: **None**
Data Bits: **8**
Stop Bit: **1**

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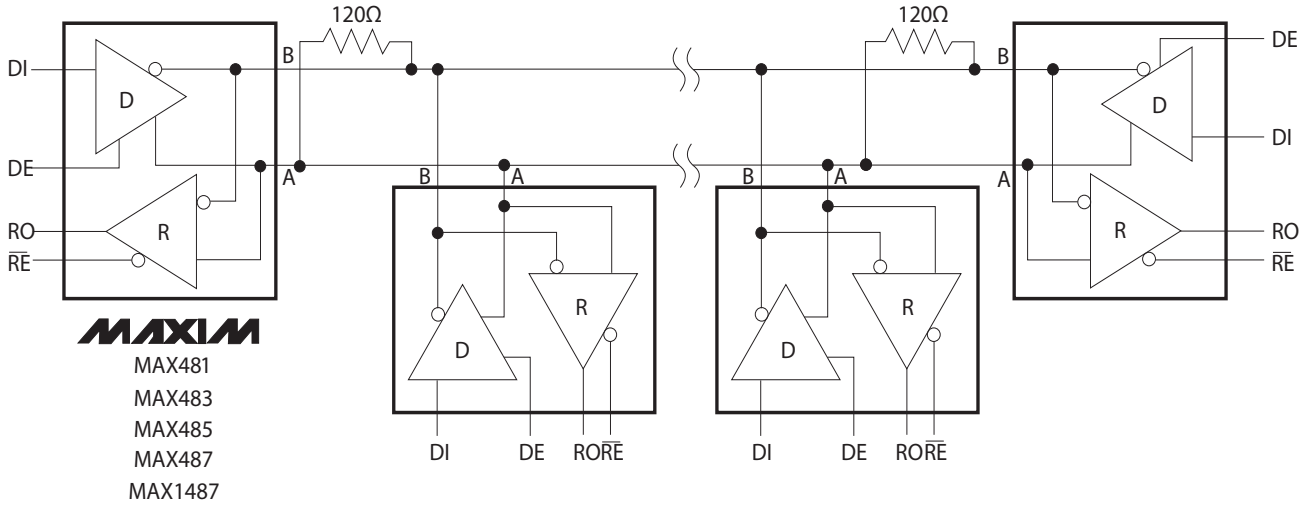
Control

3. Physical Connection

Communication network is showed below. Control board can be connected to RS485 on which is connected more than one unit. Address conflicts on this line should be removed and necessary software settings should be done for data communication.



If the line is too long or if any communication problem occurs, 120 Ohm resistance should be added at the beginning and end of the line as shown on schema.

3. Modbus Functions

Communication package is the same for each function. First address information of relevant module is sent on package. After added information type, CRC code which is a failure code that evaluates accuracy of package is sent.

Table 3.1 Modbus package type sent.

Address Information	Function Code	Data	Failure Control (CRC16)

Control board supports only two of standard functions of Modbus. These codes are 03 register reading (Table 3.2) and 06 register writing (Table 3.3). In the example below (Table 3.2), master wants to know the 16 bit data on 2nd register. Corresponding response value of control board is shown on the table below. In the second example (Table 3.3), master wants to write the 16 bit data on 2nd register and it is reported to control board that the data was written.

Table 3.2 Function 03 Transfer Package Example

Master Transfer				
Address Information	Function Code	Register ID	Data Length	Failure Control
0x01	0x03	0x00,0x02	0x00,0x01	0x25,0xCA
Response of Control Board				
Address Information	Function Code	Register ID	Data Length	Failure Control
0x01	0x03	0x00	0x07,0xFF	0xFA,0x0,34

Table 3.3 Function 06 Transfer Package Example

Master Transfer				
Address Information	Function Code	Register ID	Data Length	Failure Control
0x01	0x06	0x00,0x02	0x0C,0x00	0x2D,0x0A
Response of Control Board				
Address Information	Function Code	Register ID	Data Length	Failure Control
0x01	0x03	0x00, 0x02	0x0C,0x00	0x2D,0x0A

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Control

Modbus Register List

ID	Name	Multiplier	Access	Unit	Limit	Valid	Explanation
0	Versions of program	1	r	-	-	-	Versions of installed program
1	Unit On / Off	1	rw	-	[0,1]		0-Stop, 1-Start
6	Speed of supply fan	1	r	rpm	-	-	
7	Speed of supply fan	1	r	rpm	-	-	
11	Outdoor air temperature	0.1	r	°C	-	-	TerOA
12	Return air temperature	0.1	r	°C	-	-	TerRA
13	Supply air temperature	0.1	r	°C	-	-	TerSA
14	Panel temperature	0.1	rw	°C	[-40,80]	-	TerP
15	Sensor input-1	0.1	r	%	-	-	HID
16	Sensor input-2	1.1	r	%	-	-	SENSOR
25	Alarm code	1	r	-	-	-	Failure Code
36	Rotor status	1	r	-	[0,1]	--	0-Off 1-On
37	By-pass status	1	rr	-	[0,1]	-	0-Off 1-On
38	Pre-heater status	1	r	-	[0,1]	-	0-Off 1-On
39	After heater 1st stage status	1	r	-	[0,1]	-	0-Off 1-On
40	After heater 2nd stage status	1	r	-	[0,1]	-	0-Off 1-On
50	Mode selection	1	rw	-	[0,3]	-	0-Standard, 1-Only exhaust fan, 2-Only supply fan, 3-VOD
51	Modbus address	1	rw	-	[1,254]		
52	Supply fan velocity stage	1	rw	-	[0,2]		0-low, 1-med, 2-high
53	Exhaust fan velocity stage	1	rw	-	[0,2]		0-low, 1-med, 2-high
56	Temperature set point	1	rw	°C	[18,28]		
63	Humidity sensor set point	1	rw	%	[40,60]		
89	DX* running mode	1	rw	-	[0,2]		0-Automatic, 1-Cooling, 2-Heating
101	Panel modbus address	1	rw	-	[1,254]		

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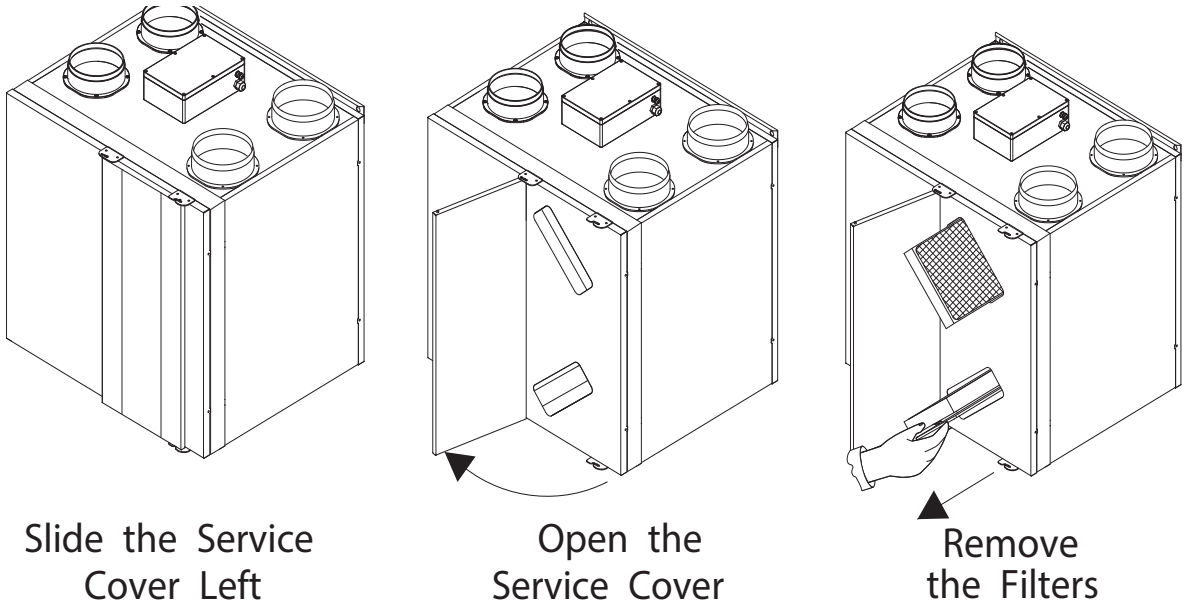
Maintenance

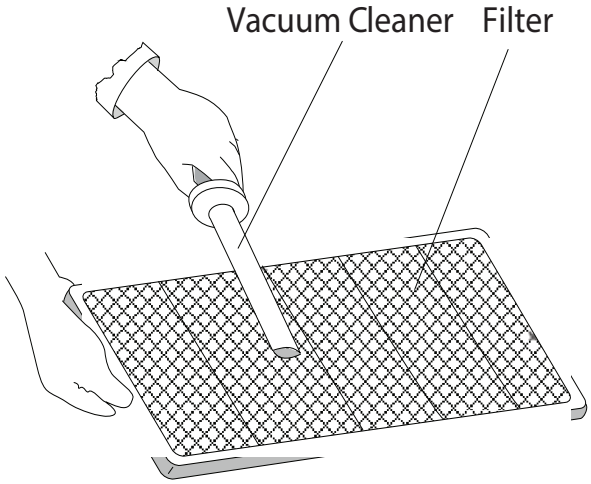
Maintenance

- TURN OFF all the power switches before the maintenance is performed.
- Do not operate the system without the air filter to protect the components of the unit against being clogged.
- Clean up the air filter every 3 months. Filters should be replaced every 6 months.
- Clean up the heat exchanger every 2 years.

Air Filter Cleaning



Step 1: Slide left, open the service cover and then remove the filters.



Step 2: Use a vacuum cleaner to suck up the dust from the air filter. If necessary, use warm water with addition a house detergent to remove the persistent dirt. Leave to dry after cleaning the air filter.

Note: If F class filter is used, when filter gets dirty, do not clean! F class filters should be replaced if it is dirty.

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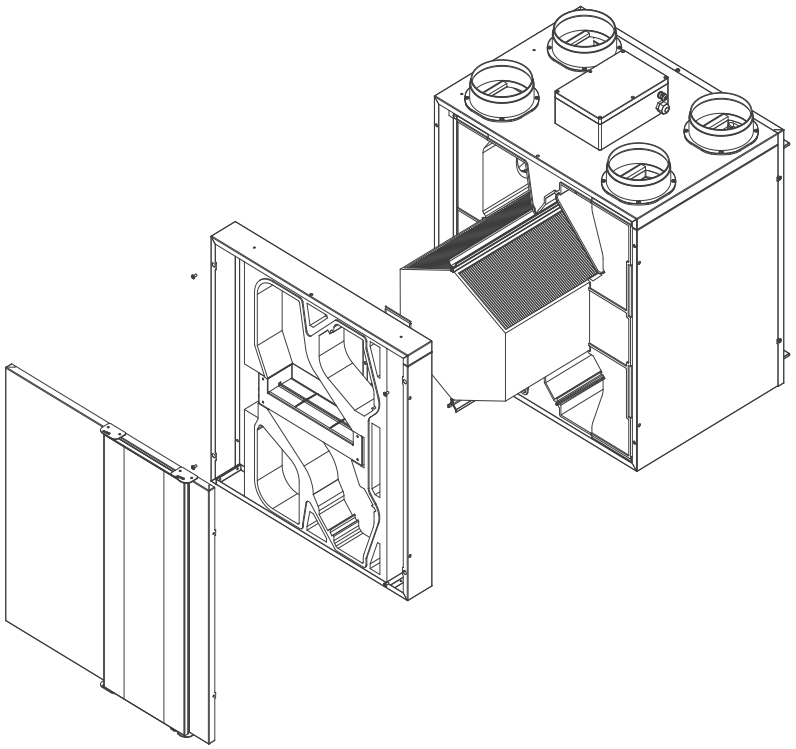
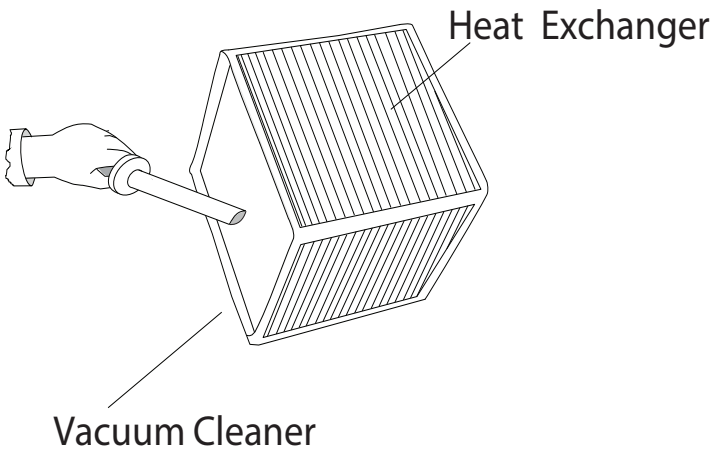
Maintenance

Heat Echanger Cleaning



Step 1: Remove the front cover plate (see page 8), then remove the by-pass (see page 9) and then remove heat exchanger out from the main unit.
Note: The maximum weight of heat exchanger is 5,5kg.



Step 2: No cleaning with fluids (including water); only careful dust removal from air intake surfaces with a household vacuum cleaner.

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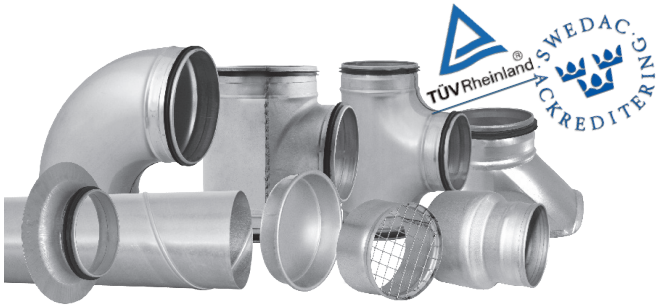
Offer

Find more produts for ventilation systems:

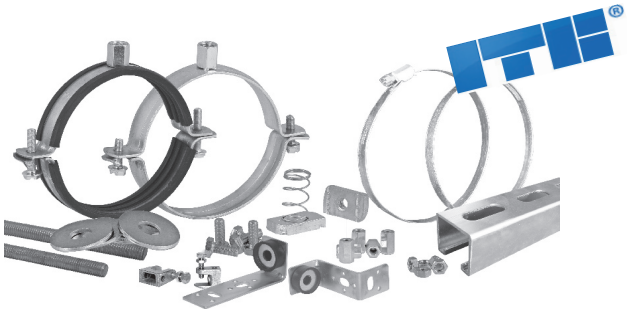
Rectangular ducts and fittings



Valves, grilles and diffusers

FLX REKU Household Ventilation

Ventilation assembly accessories



Insulation for ventilation ducts

Flexible ducts

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